Epidemiology of Hepatocellular Carcinoma in a Canadian University Centre

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Abstract

Introduction

Nearly 85% of HCC cases are reported in Asia and Saharan Africa. This explains why data on risk factors often concerns Asian populations. In fact, hepatitis B and C are among the major risk factors leading to HCC in current literature. We believe our predominantly Caucasian population might not be the same given the different incidence of Non-Alcoholic Steatohepatitis (NASH) or alcoholic cirrhosis compared to these countries. In this study, we evaluated the prevalence of risk factors of HCC in our Canadian population in order to prevent and identify the best treatments for our population. Since the cause leading to HCC might modify management in the future, it becomes interesting to describe the epidemiology of our population.

Methods

We retrospectively reviewed 196 files of patients 18 years of age and older diagnosed with HCC by radiological or pathological criteria between 2010 and 2020 from two of our university databases (Registre Local du Cancer and Ned-Écho). The prevalence of cirrhosis, hepatitis B, hepatitis C, alcoholic cirrhosis and NASH were presented using proportion with the Wilson method using 95% confidence interval. Z tests were used to compare the prevalence of our population's HCC risk factors with the literature values. Finally, a Cox model was used to assess the risks factors contributing most to mortality.

Results

178 patients were included in our study. 94.9% of our population was Caucasian. 83.1% were male and 19.6% did not have an underlying cirrhosis. Only 59% had a CHILD A cirrhosis limiting accessibility to treatment. Furthermore, the prevalence of hepatitis B was 4.7% compared to 33% in current literature ($p< 0.001$), hepatitis C was 25.1% compared to 21% ($p =0.183$), alcoholism was 45% compared to 30% ($p< 0.001$), NASH was 37.8% compared to less than 16% ($p=0.002$). There was no statistical difference in mortality by cancer risk factor.

Discussion

New evidence suggest that HCC related to NASH may be a favourable prognostic factor in patients treated with lenvatinib. Hence, the choice of a tyrosine kinase treatment might be better for the management of a Caucasian population. Promoting good lifestyle habits might also reduce the incidence of HCC in our Canadian population given the high prevalence of HCC related to NASH and alcoholic cirrhosis. Finally, approximatively half of our population had a CHILD A cirrhosis which emphasizes how crucial it is to adequately screen for HCC before cirrhosis progression as this will have an effect on management and prognostic.

Introduction

- Hepatocellular carcinoma (HCC) is the most prevalent malignant hepatic cancer worldwide.
- Almost 85% of cases are reported in Asia and Saharan Africa[1]. As a result, data on the epidemiology of HCC including risks factors often concern Asian population.
- Main objective
  - Determine the prevalence of risks factors of HCC in our predominantly Caucasian population in order to compare them to existing data.
- Secondary objectives
  - Determine the overall survival (OS) of our HCC population.
  - Compare OS according to the risk factor leading to HCC.

Methods and Materials

- Retrospective study in a single university centre in Quebec, Canada.
- 196 patients of 18 years old and older diagnosed with HCC by radiological or pathological criteria between 2010 and 2020 were included in this study.
- These files were provided from two of our university databases (Registre Local du Cancer and Ned-Écho).
- Exclusion criteria
  - Patient not followed by a gastroenterologist or an oncologist from our university centre.
  - Concomitant cancer with the exception of non-melanoma skin cancer.

Table 1. Demographics Characteristics.

Demographics	Number (n) (%)	95% Confidence Interval
Median age of diagnostic	70	
Gender		
Male	148/178 (83.1)	83.1 [77.0-87.9]
Female	30/178 (16.9)	16.9 [12.1-23.0]
Ethnicity		
Caucasian	169 (94.9)	94.9 [90.3-97.5]
Other	9 (5.1)	5.1 [2.7-9.3]
Liver cirrhosis	144/177 (81.4)	[75 - 86.4]
Child-Pugh score		
A	84/141 (59.6)	59.6[50.2-66.1]
B	44/141 (31.2)	31.2[23.6-38.5]
C	13/141 (9.2)	9.2[5.4-14.8]
Metastatic disease	33/128 (25.8)	25.8[19.0-34.0]
Portal hypertension	116/171 (67.8)	67.8[60.5-74.4]
Oesophageal Varices	61/91 (67.0)	67.0[56.9-75.8]
Significant Varices	18/91 (19.7)	19.7[12.9-29.1]
Portal thrombosis	43/172 (25.0)	25.0[19.1-32.0]

Statistical analysis

- Main objective
  - Frequencies and percentages were calculated for all the risk factors studied as well as their 95% confidence interval.
  - Z tests were used to compare our population's HCC risk factors with the literature values.
  - A cox model was used to assess the risk factors contributing the most to HCC mortality.
- Secondary objectives
  - Kaplan-Meier model was used, where OS was defined as the difference between the date at last follow-up or the date of death and the date of HCC diagnosis.

Results

- 196 patients were provided by our university databases.
  - 18 exclusions
    - 16 patients with a concomitant non-HCC cancer history
    - 2 patients with incomplete data
- Demographics
  - 94.9% of our population is Caucasian.
  - Almost 20% of our population is not cirrhotic which represents 33 individuals.
    - 13 of these patients have a NASH history.
  - Only 59.6% of our population has a Child-Pugh score A.
- Overall survival
  - The overall median survival in our population is 10.7 months [6.0– 15.5].
  - There was no significant statistical difference in mortality by cancer risk factor. However, there seem to be a tendency for higher mortality in hepatitis C patients ($p=0.091$).

Table 2. Prevalence of risk factors and comparison.

	Number	95% confidence interval	Literature reference[2]	P value
Hepatitis B	162/170 (4.7)	4.7 [2.4 - 9]	33	<.0001
Hepatitis C	43/171 (25.1)	25.1 [19.2 - 32.2]	21	0.183
Alcohol	94/171 (45.0)	45.0 [37.8 - 52.5]	30	<.0001
NASH	65/172 (37.8)	37.8 [30.9 - 45.2]	...	
Other	12/170 (7.1)	7.1 [4.1 - 11.9]	16	0.002

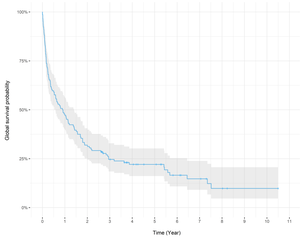

Figure 1. Overall survival considering all causes of death.

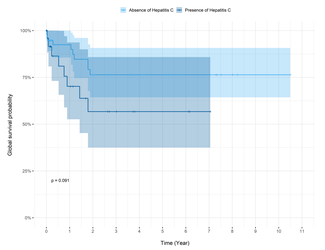

Figure 2. Overall survival for hepatitis C.

Discussion

- Main risk factors leading to HCC are different in our predominantly Caucasian population compared to literature.
  - Alcoholic cirrhosis is the leading cause in our population whereas hepatitis B is the leading cause worldwide.
    - Hepatitis B is the least prevalent in our population.
  - The prevalence of hepatitis C, on the other hand, is similar.
- NASH is an important risk factor in our study.
  - 37.8% of our HCC population has NASH compared to less than 16% in current literature.
    - Higher prevalence of obesity and metabolic syndrome in North America
- Recent evidence shows that NASH might be a favorable independent prognostic factor in patients treated with a tyrosine kinase such as lenvatinib[3].
  - Therefore, the choice of a tyrosine kinase might be better for management of HCC in a Caucasian population given the high prevalence of NASH in our study.
- The importance of screening cirrhotic patients for HCC is demonstrated in this study.
  - More than 40% have a CHILD B cirrhosis or more limiting access to treatments options.
- Around 20% of our population do not have an underlining cirrhosis leading to HCC.
  - This shows the limitation of current guidelines since there is no recommendations for HCC screening in non-cirrhotic patients.
  - More than third of these patients have a NASH history. This brings us to question if additional HCC screening guidelines should be proposed for NASH patients without concomitant cirrhosis.
- Hepatitis C has a tendency towards an unfavorable outcome in HCC patients.
  - This can be explained by the unavailability of curative measures against HCV until recently.

Conclusions

- Our study shows that alcohol and NASH are the two leading causes of HCC in our predominantly Caucasian population.
- New evidence shows that HCC related to NASH seems to be a favorable prognostic factor in patient treated with lenvatinib suggesting that a tyrosine kinase might be better for the management of a Caucasian population.
- Our results emphasize the importance of a thorough HCC screening since more than 40% of our population had an advanced liver failure when HCC was diagnosed which can affect their management and prognostic.

Contact

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